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Materials Laboratory Division

National Transportation Safety Board

Investigation Into Trans World Airlines Flight 800

Breakup Sequence Presentation

- Formation of the "Metallurgy and Structures/Sequencing Group"
- Description of wing center section
- Overall sequence with details on
  - Specific portions of the sequence and
  - Evidence of an overpressure event
- Video of reconstruction showing sequence

Metallurgy and Structures/Sequencing Group

- Group members from Boeing; TWA; ALPA; International Association of Machinists, Aerospace Workers, and Flight Attendants; and the Federal Aviation Administration
- The group's task was to identify how the airplane broke apart and where the breakup initiated
- The group examined structure at Calverton, Long Island


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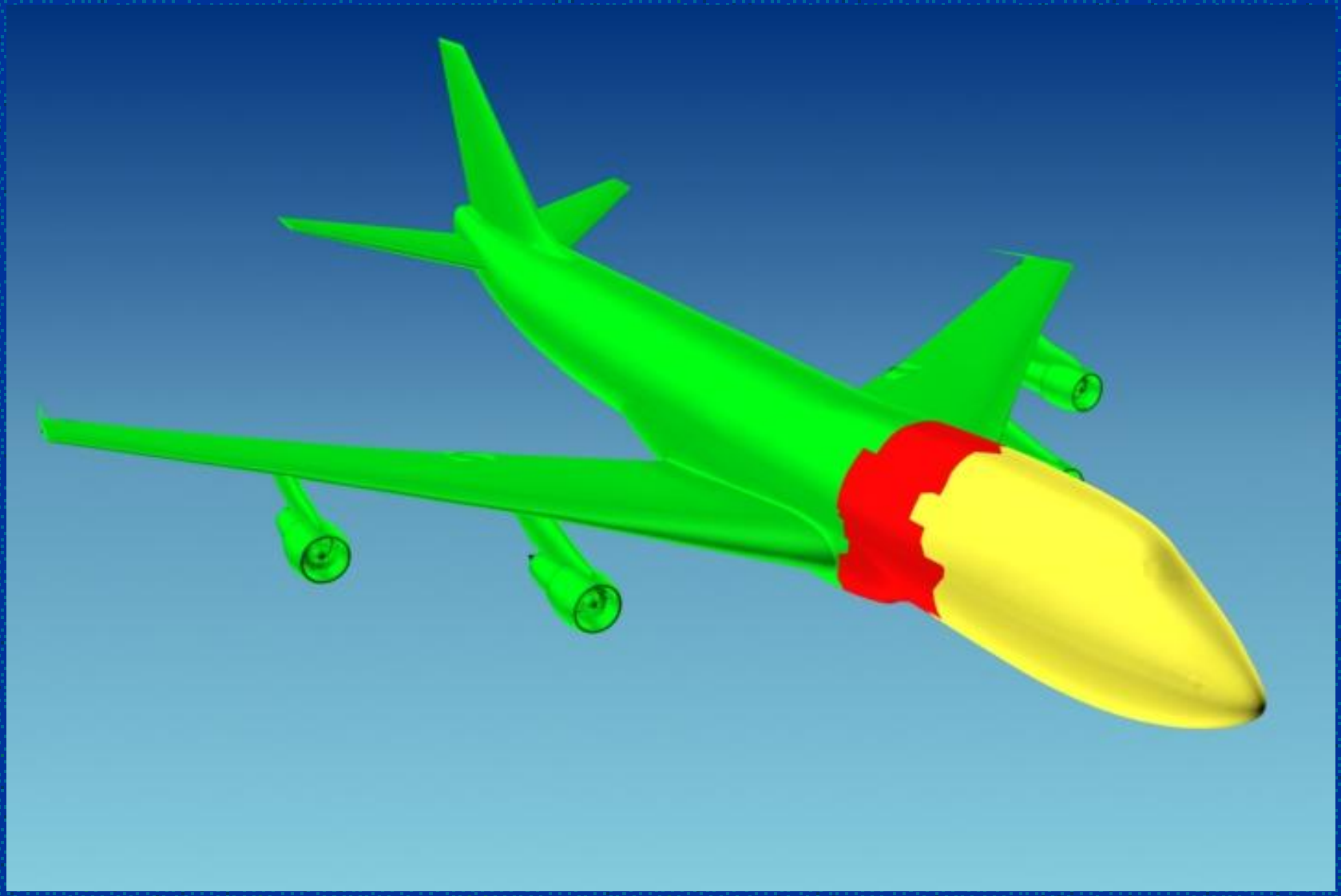

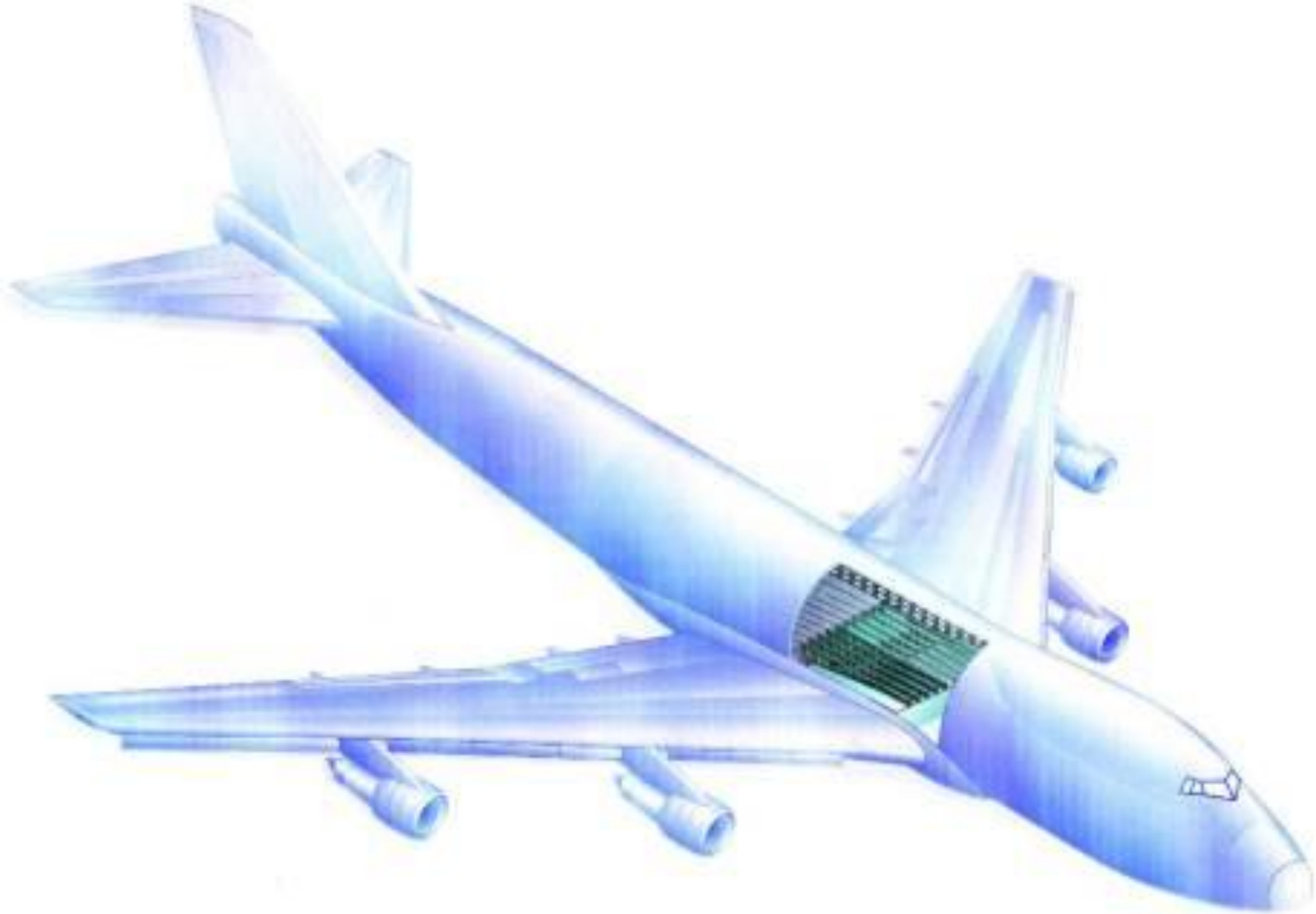

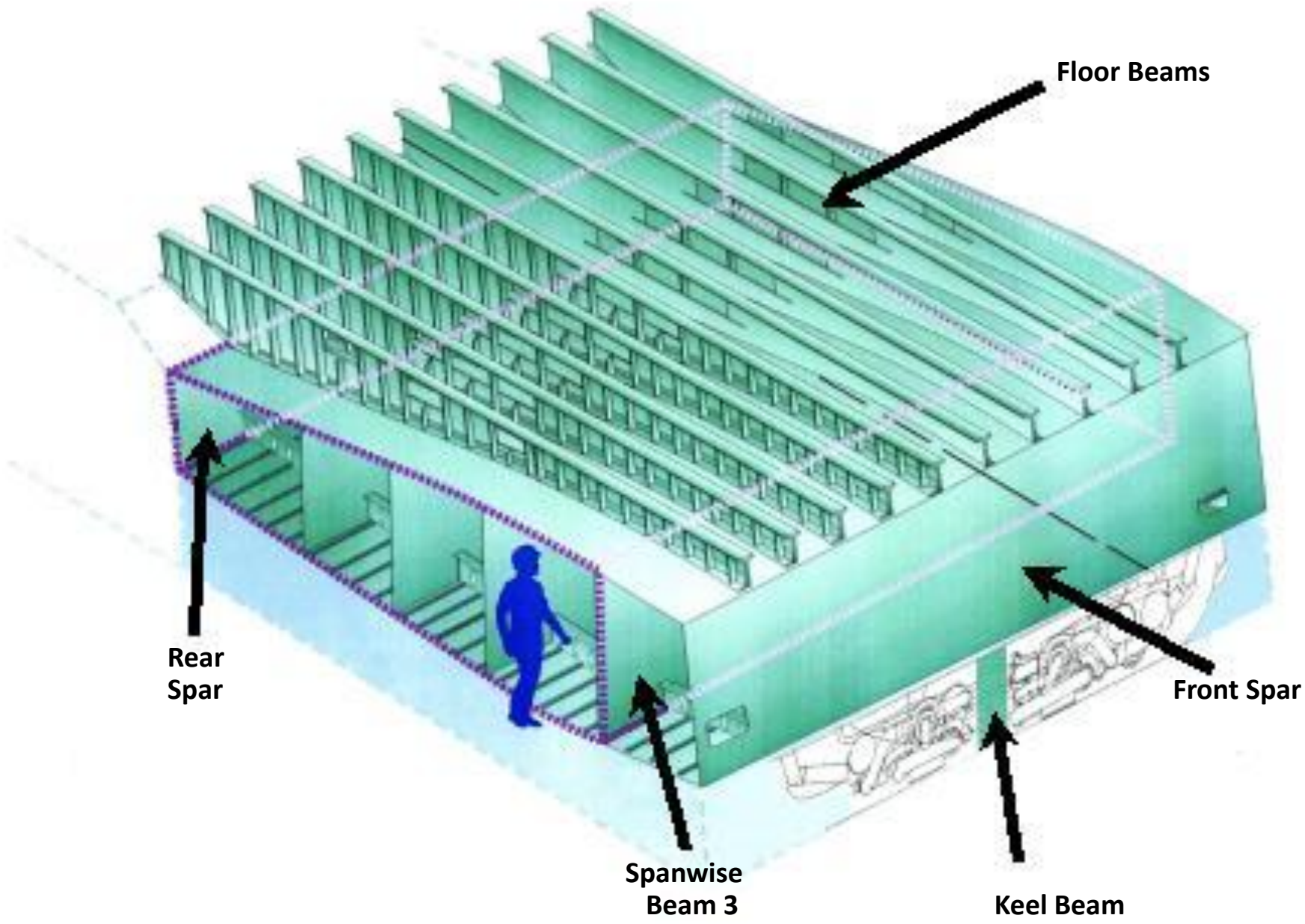
Floor Beams
Rear
Spar
Front Spar
Spanwise
Beam 3
Keel Beam

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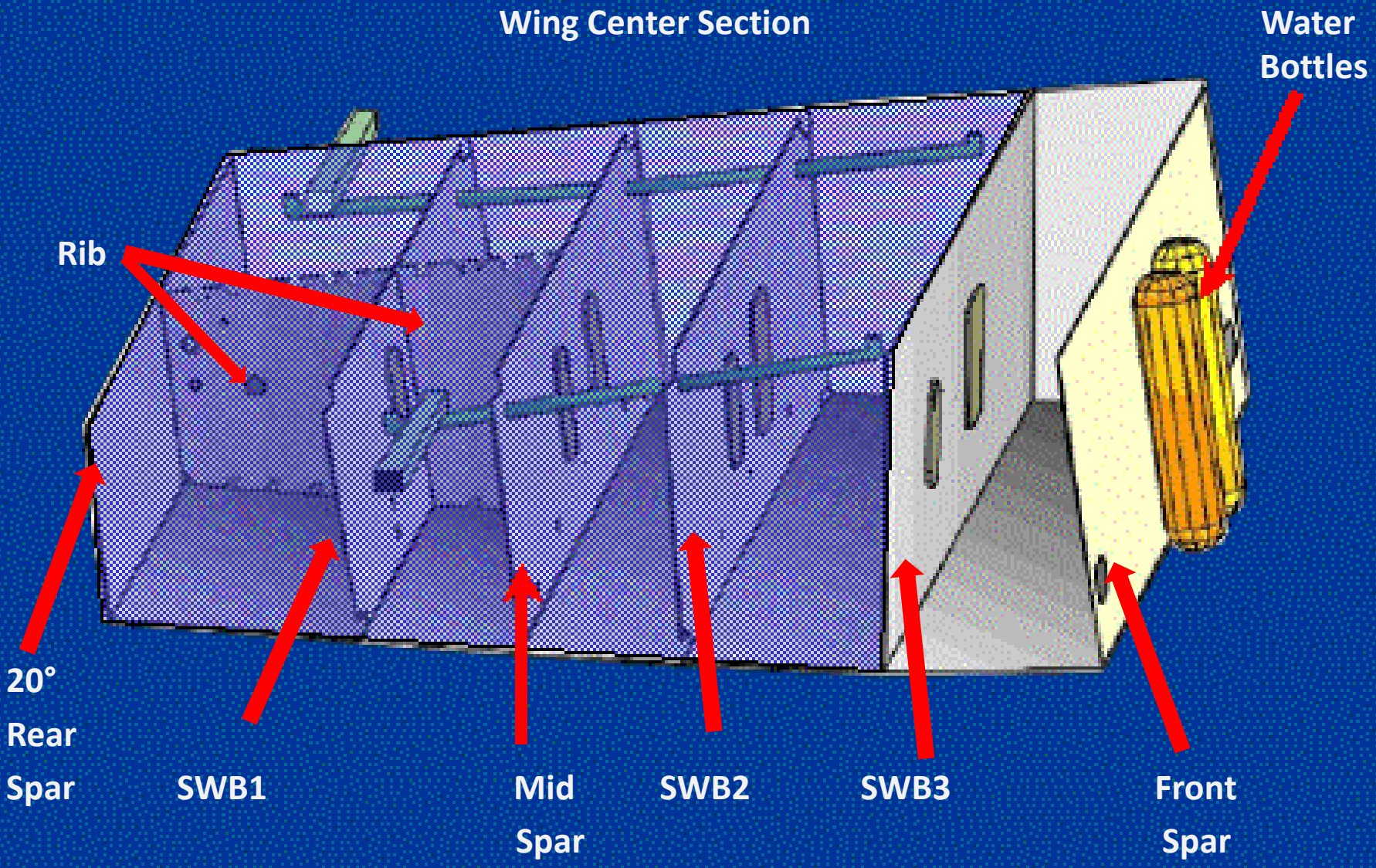

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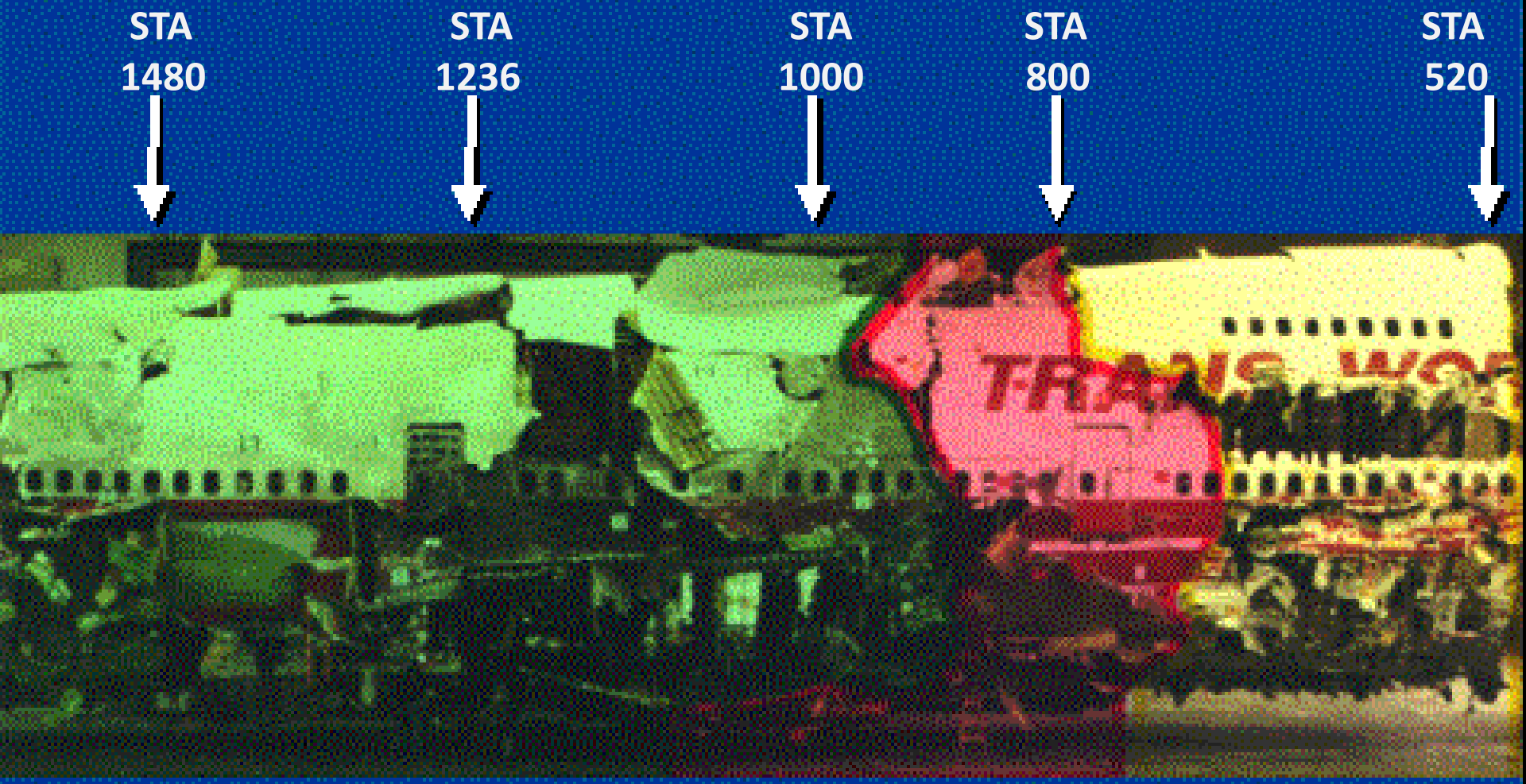


Right Side View

Forward

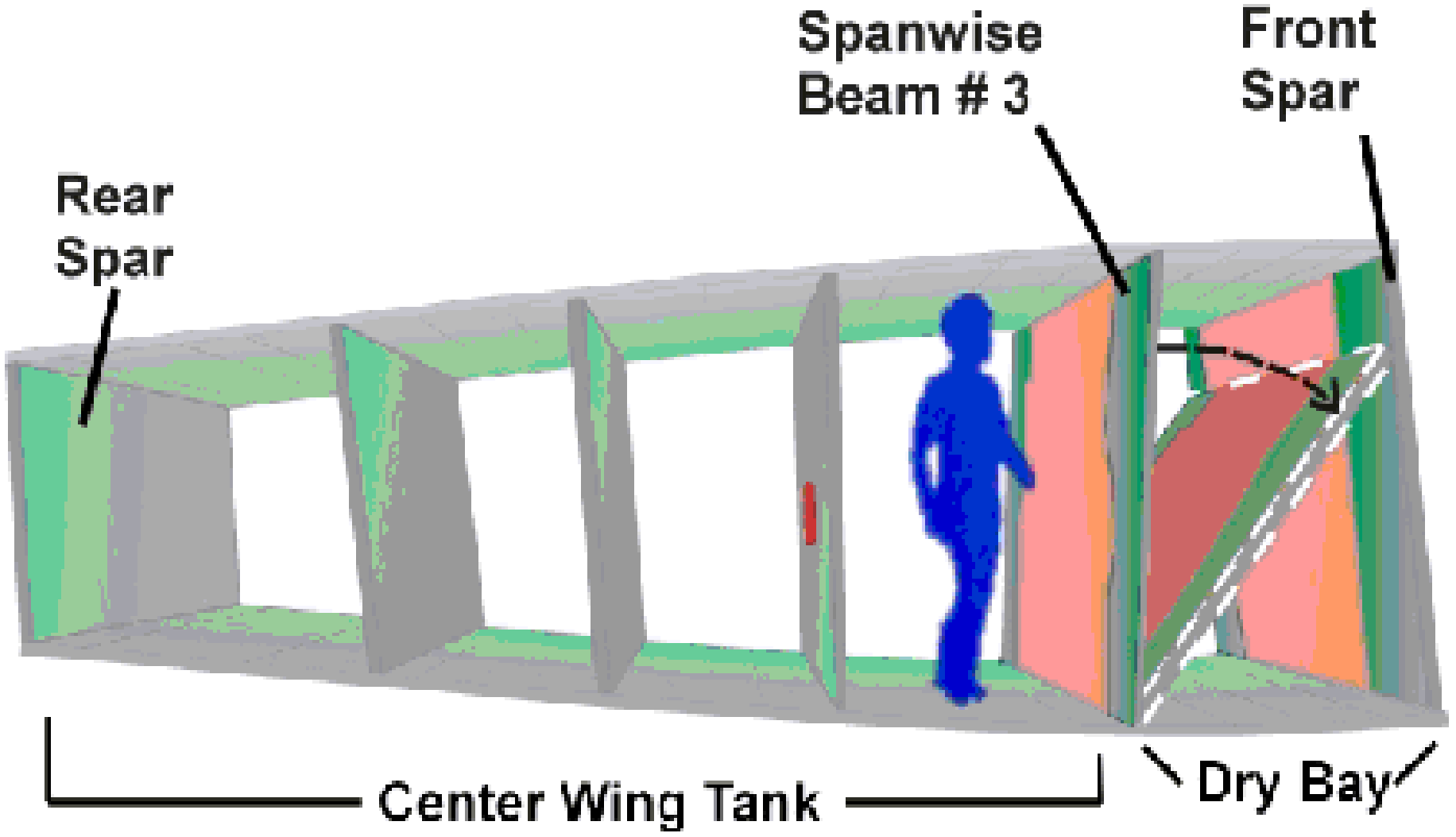
Front
Spar

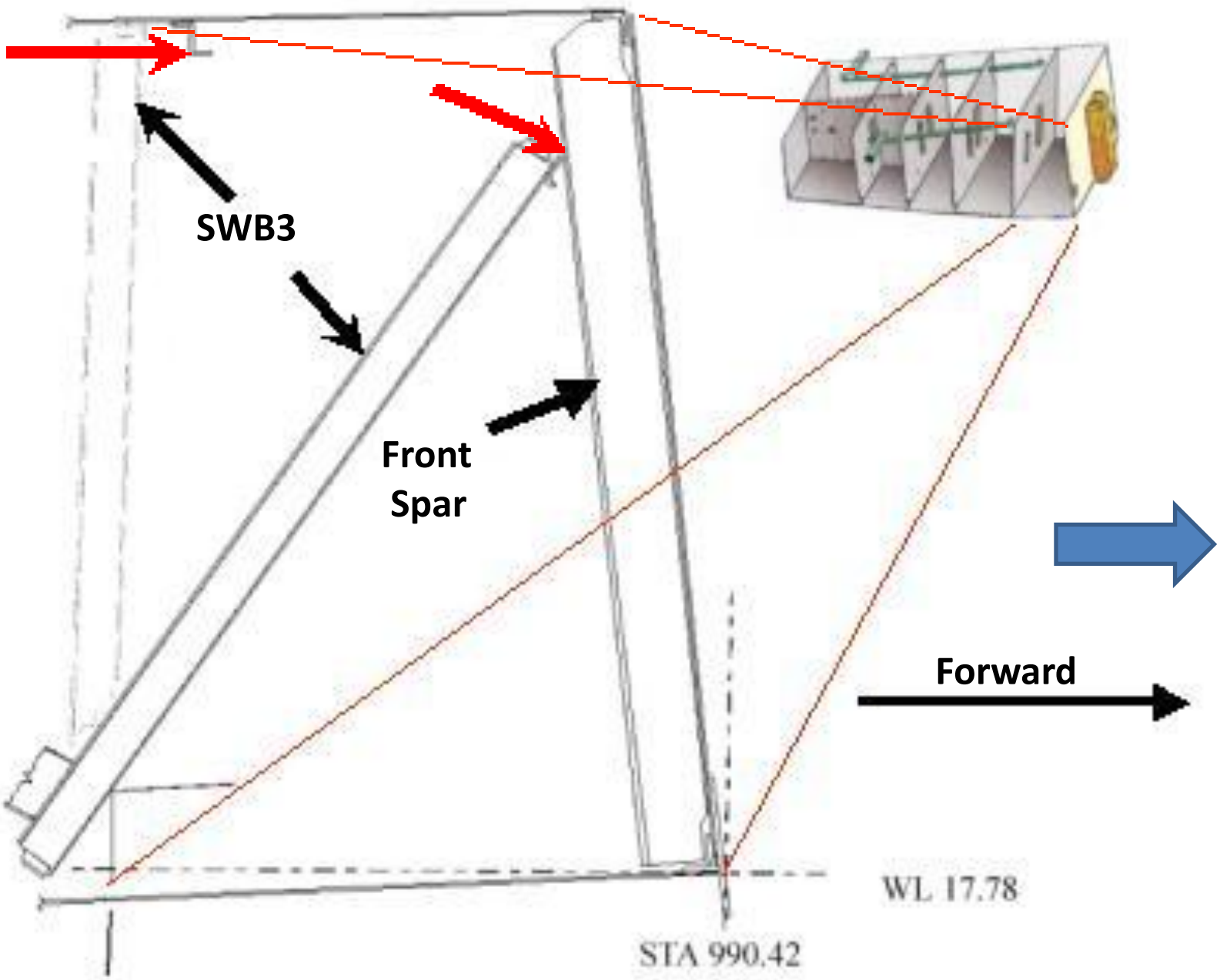
Right Side View

Forward

Breakup Sequence

Spanwise beam 3 fractured at its upper end, then
rotated forward

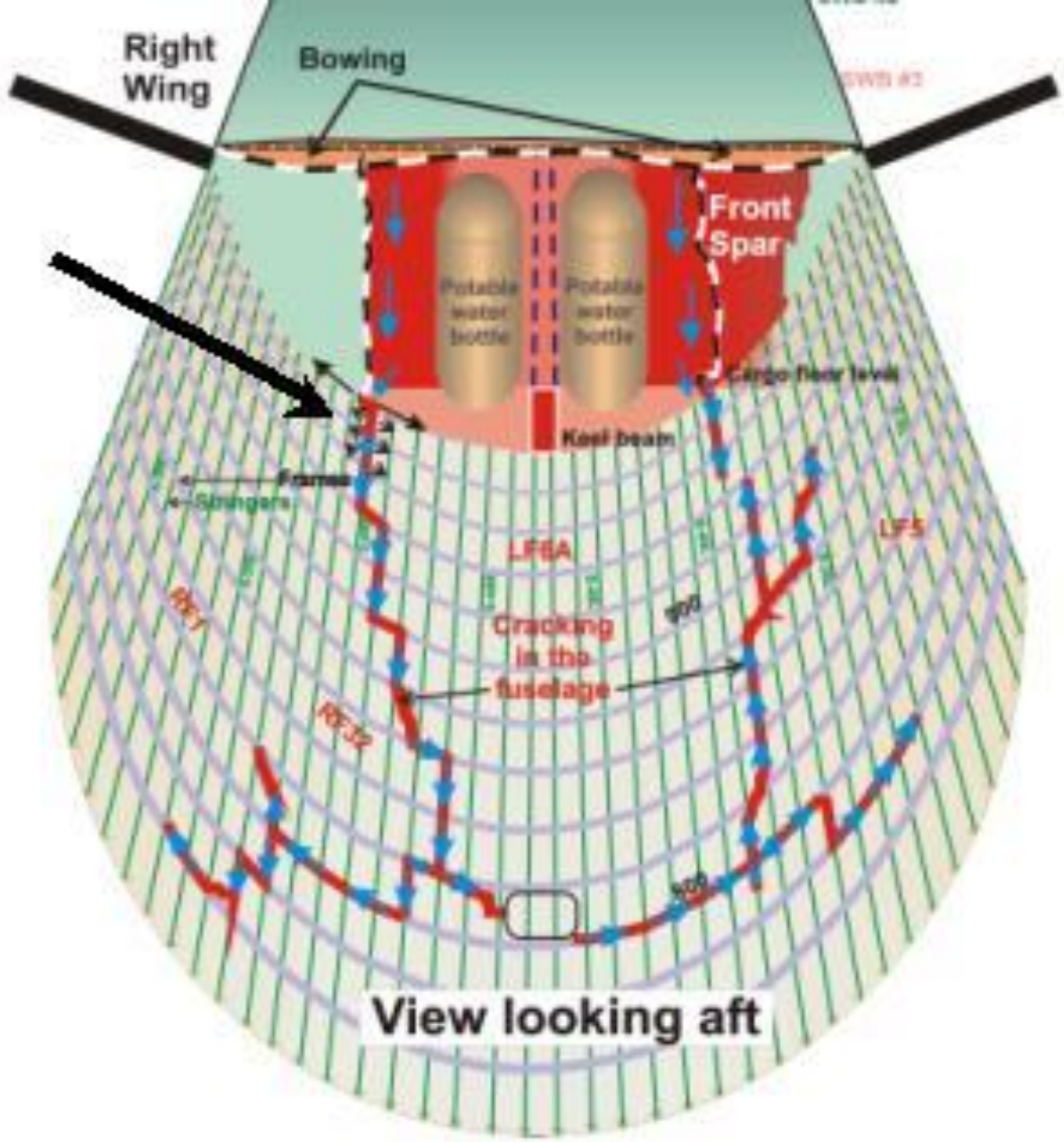

Spanwise
Beam # 3
Front
Spar
Rear
Spar
Center Wing Tank
Dry Bay


SWB3
Front
Spar
Forward
WL 17.78
STA 990.42

Breakup Sequence

Spanwise beam 3 fractured at its upper end, then
rotated forward
Front spar fractured, progressed downward, and
entered the fuselage at stringer 40R

Fuselage Cracking Initiation Area



Breakup Sequence

Spanwise beam 3 fractured at its upper end, then rotated forward
Front spar fractured, progressed downward, and entered the fuselage at stringer 40R
“Early” fuselage fractures created a hole in the belly of the airplane
Additional fuselage fractures allowed release of the nose portion

Evidence of Overpressure

- Spanwise beam 3 fracturing and rotating forward
- Upward bulging of the upper skin panel
- Forward bulging of the front spar
- Downward pressure loads initiating fracture in fuselage at S40R

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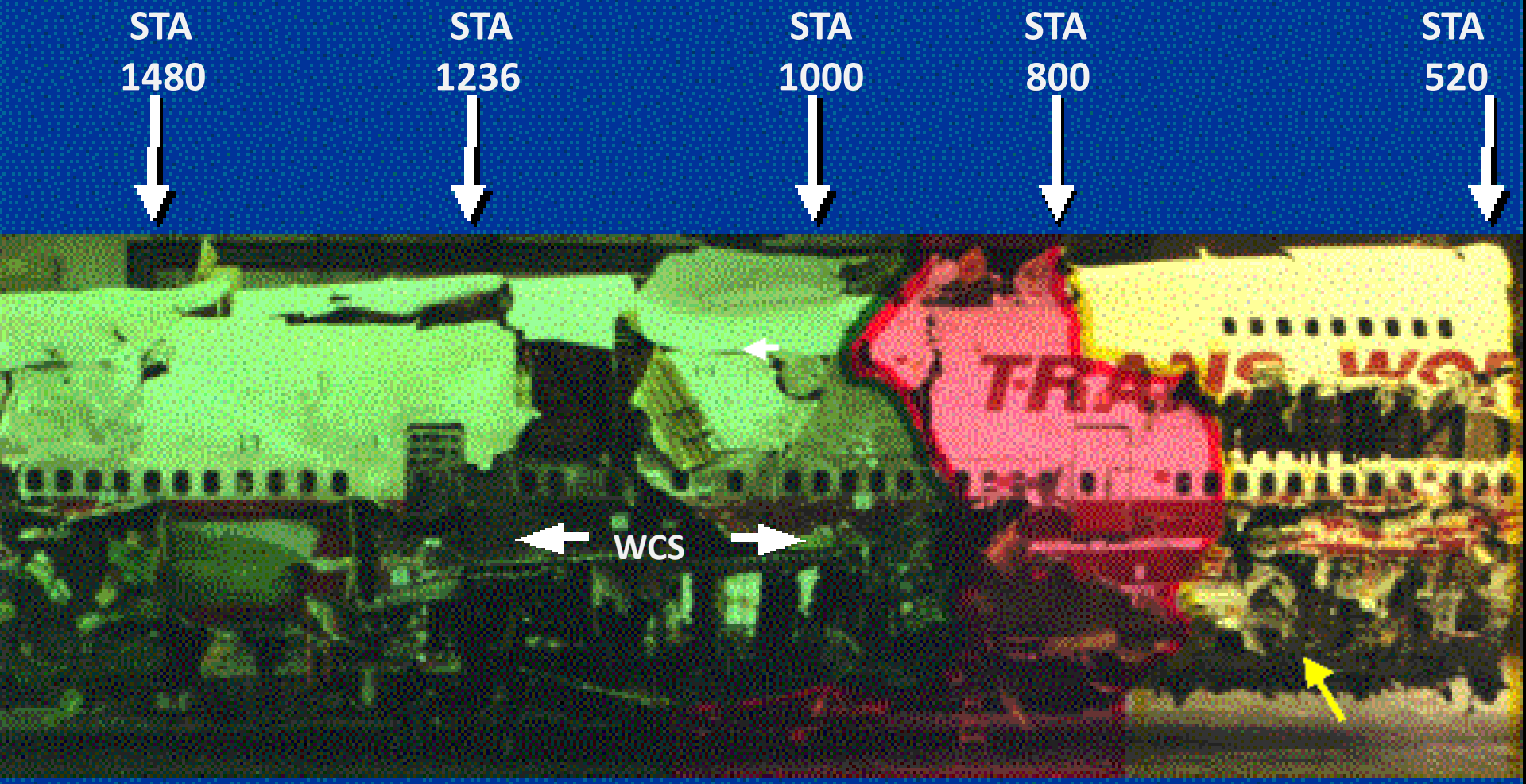

Right Side View

Forward

Breakup Sequence

Spanwise beam 3 fractured at its upper end, then rotated forward
Front spar fractured, progressed downward, and entered the fuselage at stringer 40R
“Early” fuselage fractures created a hole in the belly of the airplane
Additional fuselage fractures allowed release of the nose portion
Main portion of the airplane (most of the wing center section, wings, aft fuselage, and tail) remained intact, then climbed and rolled
Main portion broke up further as speeds and loads increased during descent

Conclusion

Breakup of the TWA flight 800 airplane initiated
with the fracture of spanwise beam 3 as a result of
an overpressure event within the center wing tank.


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